# **PS-24-10 CTD Dataset Documentation**

## **Dataset Information**

**Dataset Title:** Mesophotic and Deep Benthic Communities: CTD sensor data collected from the R/V *Point Sur* in the Gulf of Mexico for the MDBC expedition PS-24-10 from 2023-10-09 to 2023-10-18.

**Dataset Description:** This dataset containsCTD rosette sensor files collected from casts aboard R/V *Point Sur* during MDBC Cruise PS-24-10. The ship conducted CTD casts at multiple sites in the depth range from 59 to 101 meters in the northeastern Gulf of Mexico during the time period 2023-10-09 to 2023-10-18. The CTD survey resulted in sixteen total casts. Plots of the CTD data and coordinate locations are also included.

**Purpose:** The purpose of this dataset is to consolidate and report CTD sensor data; and to visualize the water column and patterns of water chemistry.The information was collected in the field to document salinity, temperature, oxygen, and light levels in the natural environment of the mesophotic octocorals injured by the *Deepwater Horizon* oil spill. The environmental data parameters will serve as reference points to be considered and applied to laboratory husbandry studies that support coral propagation and benthic restoration of the Gulf of Mexico.

**Project Purpose:**

The data in this accession were collected for the Mesophotic and Deep Benthic Communities (MDBC) Restoration Coral Propagation Technique Development (CPT), Mapping, Ground-truthing, and Predictive Habitat Modeling (MGM), and Habitat Assessment and Evaluation (HAE) projects. These projects were selected by the Open Ocean Trustee Implementation Group to restore natural resources injured by the 2010 *Deepwater Horizon* oil spill in the Gulf of Mexico.

The 2010 *Deepwater Horizon* oil spill was an unprecedented event. Approximately 3.2 million barrels of oil were released into the deep ocean over nearly three months. The plume of oil moved throughout the water column, formed surface slicks that cumulatively covered an area the size of Virginia, and washed oil onto at least 1,300 miles of shoreline habitats. More than 770 square miles (2,000 square kilometers) of deep benthic habitat were injured by the oil spill, including areas surrounding the *Deepwater Horizon* wellhead and parts of the mesophotic reef complex located at the edge of the continental shelf.

**Methods:** A CTD rosette was deployed in sixteen casts to a depth range of 59 - 101 meters at seven different sites across the northeastern Gulf of Mexico. The data in this package represent the environmental parameters of temperature, salinity, depth, dissolved oxygen, fluorescence, and photosynthetically available radiation (PAR), as collected through the water column. The data were collected to characterize patterns of seasonality, stratification, mixed layer depth, and light attenuation.

The CTD rosette was a Sea-Bird 32 carousel equipped with an SBE 19plus v2 SeaCat Profiler. Casts were performed in the northeastern Gulf of Mexico at seven different locations from the R/V *Point Sur* to characterize the water column structure, water chemistry, and light levels. The work was conducted from 2023-10-09 to 2023-10-18 in areas at the edge of the continental shelf offshore Mississippi, Alabama, and northwest Florida, consistent with other MDBC expeditions since October 2021.

At each location, the CTD rosette was deployed to the maximum depth, typically < 100 m, and within 5 m of the bottom. Temperature, conductivity (from which salinity and density were derived), oxygen concentration, PAR, fluorescence, beam transmission, and pressure data were collected from each cast. The data collected from the CTD were initially uploaded as .hex files into SeaSaveV7 and SBE Data Processing softwares from Sea-Bird Scientific. See Lange and Etnoyer (2024) for methods and examples.

**Cited Publications:**

* Lange, K. L., and Etnoyer, P. (2024). Data Report: Summary and Assessment of Environmental Data from MDBC Expedition R/V Point Sur, May 31–June 11, 2022. National Oceanic and Atmospheric Administration. DWH MDBC Data Report 2024-01.<https://doi.org/10.25923/34wn-2v15>

**Data Sources:**

* N/A

**Associated Datasets:**

* PS-22-08 - CTD sensor data
* PS-22-22 - CTD sensor data
* PS-23-09 - CTD sensor data
* PS-23-23 - CTD sensor data

## **People & Projects**

**Dataset Authors:**

* Etnoyer, Peter, J; Lange, Kassidy

**Principal Investigator:**

* na

**Additional Principal Investigators:**

* na

**Primary Point of Contact:**

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**Collaborators:**

* Kassidy Lange, [kassidy.lange@noaa.gov](mailto:kassidy.lange@noaa.gov), NOAA-affiliate

**Partners:**

* Partners at sea included the NOAA National Centers for Ocean Coastal Science , the U.S. Geological Survey, the University of North Carolina Wilmington Undersea Vehicles Program, and Lehigh University.

**Funding:**

* Deepwater Horizon Natural Resource Damage Assessment Open Ocean Trustee Implementation Group

**Associated Online Resources:**

* Open Ocean Trustee Implementation Group, <https://www.gulfspillrestoration.noaa.gov/restoration-areas/open-ocean>
* NOAA NMFS, Mesophotic and Deep Benthic Communities Restoration, <https://www.fisheries.noaa.gov/southeast/habitat-conservation/mesophotic-and-deep-benthic-communities-restoration>/
* NOAA NCCOS Project, Mesophotic and Deep Benthic Communities, <https://coastalscience.noaa.gov/project/scientific-support-for-mesophotic-and-deep-benthic-community-restoration-in-the-gulf-of-mexico/>

## **Extents**

**Start Date:** October 9, 2023

**End Date:** October 18, 2023

**Northern Boundary:** 30.11817

**Southern Boundary:** 29.45233

**Western Boundary:** -87.71269

**Eastern Boundary:** -86.87600

### **Keywords**

Mandatory keywords for all MDBC archival packages:

* Mesophotic & Deep Benthic Communities (MDBC)
* Natural Resource Damage Assessment Process (NRDA)
* Deepwater Horizon oil spill event (DWH)
* Open Ocean Trustee Implementation Group (OOTIG)
* PS-24-10

Mandatory GCMD institution keywords for all MDBC archival packages:

* US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)
* US DOC; NOAA, NMFS, Southeast Fisheries Science Center (SEFSC)
* US DOC; NOAA, NMFS, Office of Habitat Conservation (OHC)
* US DOC; NOAA; NESDIS; NCEI; Oceanographic and Geophysical Science and Services Division
* US DOI; US Geological Survey (USGS)

**Submitter Discovery Keywords**

* CTD

**ISO 19115 Topic Category**

* Environment, Oceans

**Sea Areas, Water Bodies, Marine Protected Areas:**

* Gulf of Mexico

**NOAA Ships, Other Ships, Platforms:**

* R/V *Point Sur*

**NCCOS Keywords:**

* NCCOS Research Priority > Marine Spatial Ecology
* NCCOS Research Topic > Ecological and Biogeographical Assessments
* NCCOS Research Location > Region > Gulf of Mexico
* NCCOS Research Location > U.S. States and Territories > N/A
* NCCOS Research Data Type > Field observation, Geospatial, Derived data product

## **File Information**

**Description of Files and Directories.**

* **Total uncompressed volume:** N/A
* **Total compressed volume:** N/A
* **Number of files:** N/A
* **Number of directories:** N/A
* **Data File Compression Type:** N/A
* **Data File Resolution:** N/A
* **GIS Projection:** N/A

**Data File Format(s):**

* **Raw data formats:**
  + .bl, .btl, .cnv, .hdr, .hex, .psa, .ros, .xmlcon
* **Image formats:**
  + .jpg

**Data Files:**

* PS2410
  + SHIPCTD - folder containing raw CTD files collected from the ship’s CTD sensors
    - SHIPCTD\_Calibration - folder containing configuration and setup files
    - ShipCTD\_Converted - folder containing converted CTD data files collection from the remotely operated vehicle’s CTD sensors
    - ShipCTD\_Graphs - folder containing .jpg plots

**Documentation Files:**

* PS2410\_CTD\_Dataset\_Documentation.pdf
* PS2410\_20231007\_SHIPCTD\_SETUP.psa
* PS2410\_20231018\_SHIPCTD\_013\_README.txt

## **Parameter Information**

● **Parameter Description: Temperature**

*Parameter: Temperature*

*Property Type: Measured*

*Units: Degrees Celsius*

*Observation Category: in situ*

*Sampling Instrument: CTD rosette*

*Sampling and/or Analyzing Method: At various locations the CTD rosette was deployed to the maximum depth, typically < 100 m, and within 5 m from the bottom. Temperature data was collected using a calibrated ITS-90, deg C temperature sensor.*

*Data Quality Method: Data was plotted and inspected using Seasave V7 and Seasoft V2 SBE software in the field and in the lab.*

● **Parameter Description: Salinity**

*Parameter: Salinity*

*Property Type: Measured*

*Units: PSU*

*Observation Category: in situ*

*Sampling Instrument: CTD rosette*

*Sampling and Analyzing Method: At various locations the CTD rosette was deployed to the maximum depth, typically < 100 m, and within 5 m from the bottom.Salinity data was derived from a calibrated conductivity sensor and reported in PSU.*

*Data Quality Method: Data was plotted and inspected using Seasave V7 and Seasoft V2 SBE software in the field and in the lab.*

● **Parameter Description: Oxygen**

*Parameter: Oxygen*

*Property Type: Measured*

*Units: mg/l*

*Observation Category: in situ*

*Sampling Instrument: CTD rosette*

*Sampling and Analyzing Method: At various locations the CTD rosette was deployed to the maximum depth, typically < 100 m, and within 5 m from the bottom.Oxygen data was collected using a calibrated SBE 43 oxygen sensor.*

*Data Quality Method: Data was plotted and inspected using Seasave V7 and Seasoft V2 SBE software in the field and in the lab.*

● **Parameter Description: Density**

*Parameter: Density*

*Property Type: Measured*

*Units: kg/m3*

*Observation Category: in situ*

*Sampling Instrument: CTD rosette*

*Sampling and Analyzing Method: At various locations the CTD rosette was deployed to the maximum depth, typically < 100 m, and within 5 m from the bottom.Density data was collected using a calibrated sigma-theta density sensor.*

*Data Quality Method: Data was plotted and inspected using Seasave V7 and Seasoft V2 SBE software in the field and in the lab.*

● **Parameter Description: Photosynthetically available radiation (PAR)**

*Parameter: PAR*

*Property Type: Measured*

*Units: umol photons/m2/sec*

*Observation Category: in situ*

*Sampling Instrument: CTD rosette*

*Sampling and Analyzing Method: At various locations the CTD rosette was deployed to the maximum depth, typically < 100 m, and within 5 m from the bottom.PAR data was collected using a calibrated biospherical/LICOR PAR sensor.*

*Data Quality Method: Data was plotted and inspected using Seasave V7 and Seasoft V2 SBE software in the field and in the lab.*

● **Parameter Description: Fluorescence**

*Parameter: Fluorescence*

*Property Type: Measured*

*Units: mg/m3*

*Observation Category: in situ*

*Sampling Instrument: CTD rosette*

*Sampling and Analyzing Method: At various locations the CTD rosette was deployed to the maximum depth, typically < 100 m, and within 5 m from the bottom. Fluorescence data was collected using a calibrated WET Labs ECO-AFL/FL fluorescence sensor.*

*Data Quality Method: Data was plotted and inspected using Seasave V7 and Seasoft V2 SBE software in the field and in the lab.*

● **Parameter Description: Beam transmission**

*Parameter: Beam transmission*

*Property Type: Measured*

*Units: %*

*Observation Category: in situ*

*Sampling Instrument: CTD rosette*

*Sampling and Analyzing Method: At various locations the CTD rosette was deployed to the maximum depth, typically < 100 m, and within 5 m from the bottom. Beam transmission data was collected using a calibrated WET labs C-Star beam transmission sensor.*

*Data Quality Method: Data was plotted and inspected using Seasave V7 and Seasoft V2 SBE software in the field and in the lab.*

# **Document Information**

**Date:** May 25, 2024

**Resource Provider:** Kassidy Lange, kassidy.lange@noaa.gov

**Comment:** This data documentation describes data files archived as a NOAA NCEI data accession, and is intended to provide dataset-level metadata for the purposes of discovery, use, and understanding.

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